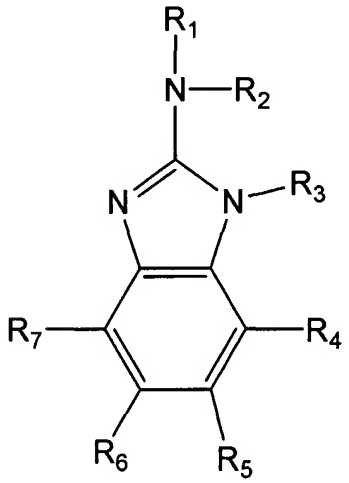
CLAIMS

What is claimed is:

1. An antibacterial colorant, comprising a colorant molecule having at least one functional group and at least one antibacterial moiety bound thereto by one of: an ester bond and an amide bond.

2. The antibacterial colorant of claim 1, wherein the antibacterial agent is a carbendazim derivative represented by the following Chemical Formula 1:

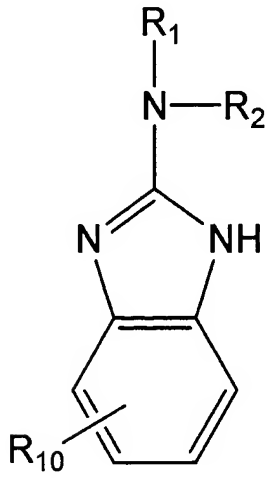
Chemical Formula 1



wherein R_1 is selected from the group consisting of a hydrogen atom, a hydroxy group, an amino group, a carboxyl group or salts thereof, a sulfonic acid group or salts thereof or a phosphoric acid group or salts thereof, and R_2, R_3, R_4, R_5, R_6 and R_7 each independently is selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxy group, a nitro group, a cyano group, an amino group, an amidino group, a hydrazine group, a hydrazone group, a carboxyl group or salts thereof, a phosphoric acid group or salts thereof, a substituted or an unsubstituted alkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted alkylthio group with 1 to 30 carbon atoms, a substituted or an unsubstituted aryl group with 6 to 30 carbon atoms, a substituted or an unsubstituted arylalkyl group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroalkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted heteroaryl group with 6 to 30 carbon atoms, and a substituted or an unsubstituted heteroarylalkyl group with 6 to 30 carbon atoms.

3. The antibacterial colorant of claim 1, wherein the antibacterial agent is a carbendazim derivative of Chemical Formula 1 represented by the following Chemical Formula 3:

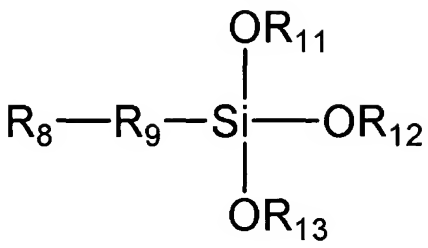
Chemical Formula 3



wherein R_1 is selected from the group consisting of a hydrogen atom, a hydroxy group and a carboxyl group, and R_2 and R_{10} each independently is selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxy group, a nitro group, a cyano group, an amino group, an amidino group, a hydrazine group, a hydrazone group, a carboxyl group or salts thereof, a sulfonic acid group or salts thereof, a phosphoric acid group or salts thereof, a substituted or an unsubstituted alkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted alkenyl or a substituted or an unsubstituted alkynyl group with 2 to 30 carbon atoms, a substituted or an unsubstituted heteroalkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted aryl group with 6 to 30 carbon atoms, a substituted or an unsubstituted arylalkyl group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroaryl group with 6 to 30 carbon atoms, and a substituted or an unsubstituted heteroarylalkyl group with 6 to 30 carbon atoms.

4. The antibacterial colorant of claim 1, wherein the antibacterial agent is a silane derivative represented by the following Chemical Formula 2:

Chemical Formula 2



wherein R_8 is selected from the group consisting of a hydrogen atom, a hydroxy group, an amino group, a carboxyl group or salts thereof, and a sulfonic acid group or salts thereof, R_9 is selected from the group consisting of a heteroatom of -O-, -N-, -S-, or -P-, a substituted or an unsubstituted alkylene group with 1 to 30 carbon atoms, a substituted or an unsubstituted alkenylene or substituted or unsubstituted alkynylene groups with 2 to 30 carbon atoms, a substituted or an unsubstituted heteroalkylene group with 1 to 30 carbon atoms, a substituted or an unsubstituted arylene group with 6 to 30 carbon atoms, a substituted or an unsubstituted arylalkylene group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroarylene group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroarylalkylene group with 6 to 30 carbon atoms, and R_{11}, R_{12}, and R_{13} each independently is selected from the group consisting of a hydrogen atom, a substituted or an unsubstituted alkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted alkenyl or a substituted or an unsubstituted alkynyl group with 2 to 30 carbon atoms, a substituted or an unsubstituted heteroalkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted aryl group with 6 to 30 carbon atoms, a substituted or an unsubstituted arylalkyl group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroaryl group with 6 to 30 carbon atoms, and a substituted or an unsubstituted heteroarylalkyl group with 6 to 30 carbon atoms.

5. The antibacterial colorant of claim 1, wherein the colorant molecule is one of: a dye and a pigment.

6. An ink composition comprising:

a carrier medium; and

an antibacterial colorant, comprising a colorant molecule having at least one functional group and at least one antibacterial moiety bound thereto by one of: an ester bond and an amide bond.

7. The ink composition of claim 6, wherein the amount of the antibacterial colorant is 1 to 20 parts by weight per 100 parts by weight of the composition.

8. The ink composition of claim 6, wherein the carrier medium is one of: water, at least one organic solvent, and a mixture thereof

9. The composition according to claim 6, wherein when the carrier medium is a mixture of water with at least one organic solvent, the organic solvent is added to the composition in an amount of 5 to 50 parts by weight based on 100 parts by weight of the composition.

10. The ink composition of claim 8, wherein the at least one organic solvent is selected from the group consisting of : alcohols, ketones, esters, polyhydric alcohols, low-grade alkylethers, nitrogenous chemical compounds, and sulfurous chemical compounds.

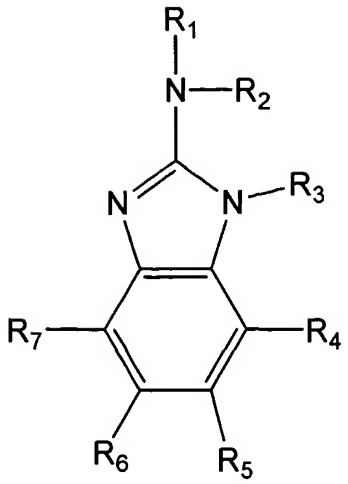
11. The composition according to claim 6, further comprising at least one selected from the group consisting of a dispersing agent, a viscosity control agent, a surfactant, a storage stabilizer, a humectant, and a metallic oxide.

12. An ink composition comprising:

a carrier medium; and

an antibacterial colorant, comprising a colorant molecule having at least one functional group and at least one antibacterial moiety bound thereto by one of: an ester bond and an amide bond, wherein the antibacterial agent is a carbendazim derivative represented by the following Chemical Formula 1:

Chemical Formula 1



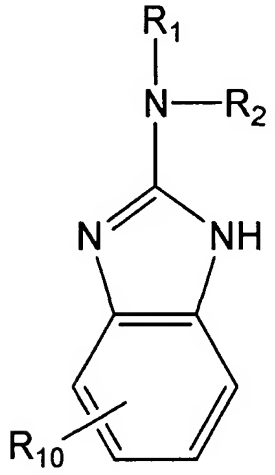
wherein R_1 is selected from the group consisting of a hydrogen atom, a hydroxy group, an amino group, a carboxyl group or salts thereof, a sulfonic acid group or salts thereof or a phosphoric acid group or salts thereof, and R_2, R_3, R_4, R_5, R_6 and R_7 each independently is selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxy group, a nitro group, a cyano group, an amino group, an amidino group, a hydrazine group, a hydrazone group, a carboxyl group or salts thereof, a phosphoric acid group or salts thereof, a substituted or an unsubstituted alkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted alkylthio group with 1 to 30 carbon atoms, a substituted or an unsubstituted aryl group with 6 to 30 carbon atoms, a substituted or an unsubstituted arylalkyl group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroalkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted heteroaryl group with 6 to 30 carbon atoms, and a substituted or an unsubstituted heteroarylalkyl group with 6 to 30 carbon atoms.

13. An ink composition comprising:

a carrier medium; and

an antibacterial colorant, comprising a colorant molecule having at least one functional group and at least one antibacterial moiety bound thereto by one of: an ester bond and an amide bond, wherein the antibacterial agent is a carbendazim derivative of Chemical Formula 1 represented by the following Chemical Formula 3:

Chemical Formula 3



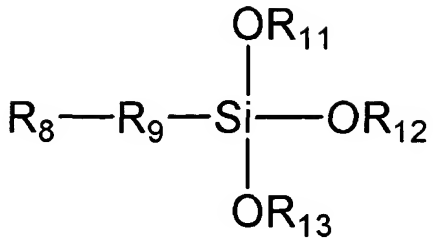
wherein R_1 is selected from the group consisting of a hydrogen atom, a hydroxy group and a carboxyl group, and R_2 and R_{10} each independently is selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxy group, a nitro group, a cyano group, an amino group, an amidino group, a hydrazine group, a hydrazone group, a carboxyl group or salts thereof, a sulfonic acid group or salts thereof, a phosphoric acid group or salts thereof, a substituted or an unsubstituted alkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted alkenyl or a substituted or an unsubstituted alkynyl group with 2 to 30 carbon atoms, a substituted or an unsubstituted heteroalkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted aryl group with 6 to 30 carbon atoms, a substituted or an unsubstituted arylalkyl group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroaryl group with 6 to 30 carbon atoms, and a substituted or an unsubstituted heteroarylalkyl group with 6 to 30 carbon atoms.

14. An ink composition comprising:

a carrier medium; and

an antibacterial colorant, comprising a colorant molecule having at least one functional group and at least one antibacterial moiety bound thereto by one of: an ester bond and an amide bond, wherein the antibacterial agent is a silane derivative represented by the following Chemical Formula 2:

Chemical Formula 2



wherein R_8 is selected from the group consisting of a hydrogen atom, a hydroxy group, an amino group, a carboxyl group or salts thereof, and a sulfonic acid group or salts thereof, R_9 is selected from the group consisting of a heteroatom of -O-, -N-, -S-, or -P-, a substituted or an unsubstituted alkylene group with 1 to 30 carbon atoms, a substituted or an unsubstituted alkenylene or substituted or unsubstituted alkynylene groups with 2 to 30 carbon atoms, a substituted or an unsubstituted heteroalkylene group with 1 to 30 carbon atoms, a substituted or an unsubstituted arylene group with 6 to 30 carbon atoms, a substituted or an unsubstituted arylalkylene group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroarylene group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroarylalkylene group with 6 to 30 carbon atoms, and R_{11}, R_{12}, and R_{13} each independently is selected from the group consisting of a hydrogen atom, a substituted or an unsubstituted alkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted alkenyl or a substituted or an unsubstituted alkynyl group with 2 to 30 carbon atoms, a substituted or an unsubstituted heteroalkyl group with 1 to 30 carbon atoms, a substituted or an unsubstituted aryl group with 6 to 30 carbon atoms, a substituted or an unsubstituted arylalkyl group with 6 to 30 carbon atoms, a substituted or an unsubstituted heteroaryl group with 6 to 30 carbon atoms, and a substituted or an unsubstituted heteroarylalkyl group with 6 to 30 carbon atoms.

15. An ink composition comprising:

a carrier medium; and

an antibacterial colorant, comprising a colorant molecule having at least one functional group and at least one antibacterial moiety bound thereto by one of: an ester bond and an amide bond, wherein the colorant molecule is one of: a dye and a pigment.

16. The ink composition of claim 10, wherein the alcohol/alcohols is/are selected from the group consisting of: methylalcohol, ethylalcohol, n-propylalcohol, isopropylalcohol, n-butylalcohol, sec-butylalcohol, and t-butylalcohol,and isobutylalcohol.

17. The ink composition of claim 10, wherein the ketone/ketones is/are selected from the group consisting of: acetone, methylethylketone and diacetonealcohol.

18. The ink composition of claim 10, wherein the ester/esters is/are selected from the group consisting of: ethyl acetate and ethyl lactate.

19. The ink composition of claim 10, wherein the polyhydric alcohol/polyhydric alcohols is/are selected from the group consisting of: ethyleneglycol, diethyleneglycol, triethyleneglycol, propyleneglycol, butyleneglycol, 1,4-butandiol, 1,2,4-butantriol, 1,5-pentandiol, 1,2,6-h exantriol, hexyleneglycol, glycerol, glycerol ethoxylate, and trimethylolpropane ethoxylate.

20. The ink composition of claim 10, wherein the low-grade alkylether/alkylethers is/are selected from the group consisting of: ethyleneglycol monomethylether, ethyleneglycol monoethylether, diethyleneglycol methylether, diethyleneglycol ethylether, triethyleneglycol monomethylether, and triethyleneglycol monoethyl ether.

21. The ink composition of claim 10, wherein the nitrogenous chemical compound/compounds is/are selected from the group consisting of: 2-pyrrolidone and N-methyl-2-pyrrolidone.

22. The ink composition of claim 10, wherein the sulfurous chemical compound/compounds is/are selected from the group consisting of: dimethyl sulfoxide, tetramethylene sulfone and tioglycol.

23. The ink composition of claim 9, wherein the at least one organic solvent is selected from the group consisting of]: alcohols, ketones, esters, polyhydric alcohols, low-grade alkylethers, nitrogenous chemical compounds, and sulfurous chemical compounds.

24. The ink composition of claim 23, wherein the alcohol/alcohols is/are selected from the group consisting of: methylalcohol, ethylalcohol, n-propylalcohol, isopropylalcohol, n-butylalcohol, sec-butylalcohol, and t-butylalcohol,and isobutylalcohol.

25. The ink composition of claim 23, wherein the ketone/ketones is/are selected from the group consisting of: acetone, methylethylketone and diacetonealcohol.

26. The ink composition of claim 23, wherein the ester/esters is/are selected from the group consisting of: ethyl acetate and ethyl lactate.

27. The ink composition of claim 23, wherein the polyhydric alcohol/polyhydric alcohols is/are selected from the group consisting of: ethyleneglycol, diethyleneglycol, triethyleneglycol, propyleneglycol, butyleneglycol, 1,4-butandiol, 1,2,4-butantriol, 1,5-pentandiol, 1,2,6-h exantriol, hexyleneglycol, glycerol, glycerol ethoxylate, and trimethylolpropane ethoxylate.

28. The ink composition of claim 23, wherein the low-grade alkylether/alkylethers is/are selected from the group consisting of: ethyleneglycol monomethylether, ethyleneglycol monoethylether, diethyleneglycol methylether, diethyleneglycol ethylether, triethyleneglycol monomethylether, and triethyleneglycol monoethyl ether.

29. The ink composition of claim 23, wherein the nitrogenous chemical compound/compounds is/are selected from the group consisting of: 2-pyrrolidone and N-methyl-2-pyrrolidone.

30. The ink composition of claim 23, wherein the sulfurous chemical compound/compounds is/are selected from the group consisting of: dimethyl sulfoxide, tetramethylene sulfone and tioglycol.